

**THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:-/WHAT I/WE CLAIM AS MY/OUR INVENTION:-**

1. A rotary piston comprising:

a shaft to rotate about a longitudinal axis;

a rotor centrally secured to the shaft, the rotor having a body with a cylindrical surface extending between space ends;

a rotor disk secured to the rotor at each end and secured at its centre to the shaft;

a housing encasing the shaft, rotor and rotor disk within an internal cavity, the shaft extending outside of the housing, the housing having interior end walls adjacent to the rotor disks and an interior sidewall, with fluid inlet and fluid outlet ports in the sidewall, a first portion of the interior sidewall of the housing being cylindrical and curved with constant radius over an angle of about approximately  $180^\circ$ , this portion being spaced a constant distance from confronting portions of the cylindrical surface of the rotor, and a second portion of the interior sidewall of the housing extending between the extremities of the first portion of the interior sidewall and being of curvature of greater radius than that of the first portion;

the cylindrical surface of the rotor being proximal to the interior sidewall of the housing at a point between the inlet and outlet ports about midway on the second portion, the inlet and outlet ports being located in this second portion of the interior sidewall of the housing;

three or more equally spaced, radially oriented slots in the rotor longitudinally extending across its cylindrical surface;

three or more similar vanes, each having internal and external edges extending between sides, each vane slidably seated in a different one of said slots, each vane movable radially in its corresponding slot between an extended position with the external edge of the vane adjacent the interior sidewall of the housing, and a retracted position wherein the external edge of the vane does not extend beyond the cylindrical surface of the rotor, the vanes being spaced from adjacent vanes about the rotor such that there is always at least one vane positioned between the inlet and outlet ports;

an ear extending beyond the external edge of each vane at each of its sides and a pin secured to each ear and extending inwardly towards the vane's other ear, the pin of each ear seated in one of a pair of races continuously extending in portions of the interior sidewall of the housing, the races circumscribing the shaft and formed so as to provide proper extending and retracting movement of the vanes as the pins move along them during rotation of the rotor;

a plurality of slots in the rotor disks aligned with the rotor slots and slidably receiving the sides of the vanes and corresponding ears;

the rotor disk, housing and vanes constructed so that, during operation of the device, fluid entering the housing through the inlet port is carried by the rotor, in compartments formed between adjacent vanes, the rotor surface between those vanes, the rotor disk and corresponding portions of the end walls and sidewall of the housing, until the adjacent vanes encompass the outlet port where the fluid is allowed to leave the housing.

2. The rotary piston according to claim 1, wherein the rotor is provided with four slots, each slot having one of said vanes slidably seated within it.

3. The rotary piston according to claim 1, wherein one or more apertures are provided in each vane, said apertures extending from the external edge to the internal edge of their corresponding vane.

4. The rotary piston according to claim 3, wherein the external edge of each vane is provided with a seal extending along that edge, from side to side of the vane, the seal constructed so as to permit fluid passage from a chamber on one side of the vane to the bottom of the corresponding slot, below the vane, to assist in outward movement of the vane and holding the vane in extended position while restricting flow of the fluid from said compartment to the compartment on the other side of the vane.

5. According to claim 4, wherein each external edge vane seal is movable in a pocket extending along the external edge of the corresponding vane, between first and second positions on the end of the vane so as to provide passage of fluid through the corresponding vane aperture or apertures from one adjacent compartment when the seal is in said first position and from the other adjacent compartment when the seal is in the said second position.

6. According to claim 4, wherein the seal is made of brass.

7. According to claim 1, wherein an aperture through the rotor disk is provided in each quadrant between adjacent slots, and fluid seals are provided on either side of each aperture between the corresponding rotor disk and the corresponding interior end wall of the housing.

8. According to claim 7, wherein a reef valve is provided in each aperture to assist in maintaining positive pressure between the corresponding rotor disk and the housing.

9. According to claim 7, wherein the seals are in the form of piston seals, whereby increased fluid pressure on the seal causes expansion of sides of the seal to enhance resistance to passage of fluid past the seal.

10. According to claim 7, wherein a fluid seal is provided between an interior surface of each rotor disk and a portion of the interior sidewall of the housing in which the race provided, so as to assist in maintaining fluid pressure within the corresponding compartment.

11. According to claim 1, wherein the shaft, rotor and rotor disks are of integral construction.

12. the rotor disk slots providing stops for the vanes at the limits of their expanded and contracted positions.

13 A rotary piston comprising:

a shaft to rotate about a longitudinal axis;

a rotor centrally secured to the shaft, the rotor having a body with a cylindrical surface extending between space ends;

a rotor disk at each end of the rotor centrally secured to the shaft and to a corresponding end of the rotor;

a housing encasing the shaft, rotor and rotor disk within an internal cavity, the shaft extending outside of the housing, the housing having interior end walls adjacent to the rotor disks and an interior sidewall, with fluid inlet and fluid outlet ports in the sidewall, a first portion of the interior sidewall of the housing being cylindrical and curved with constant radius over an angle of about approximately 180°, this portion being spaced a constant distance from confronting portions of the cylindrical surface of the rotor, and a second portion of the interior sidewall of the housing continuing from the extremities of the first portion of the interior sidewall and being of curvature of greater radius than that of the first portion, the cylindrical surface of the rotor being proximal to the interior sidewall of the housing at a point between the inlet and outlet ports about midway on the second portion, the inlet and outlet ports being located in this second portion of the interior sidewall of the housing;

three or more equally spaced, radially oriented slots in the rotor extending across its cylindrical surface;

three or more similar vanes, each having internal and external edges extending between sides, each vane slidably seated in a different one of said slots, each vane movable radially in its corresponding slot between an extended position with the external edge of the vane adjacent the interior sidewall of the housing, and a retracted position wherein the external edge of the vane does not extend beyond the cylindrical surface of the rotor, the vanes being spaced from adjacent vanes about the rotor such that there is always at least one vane positioned between the inlet and outlet ports;

an ear extending beyond the external edge of each vane at each of its sides and a pin secured to each ear and extending inwardly towards the vane's other ear, the pin of each ear seated in a race continuously extending in a portion of the interior sidewall of the housing, the race circumscribing the shaft and formed so as to provide proper extending and retracting movement of the vanes as the pins move along them during rotation of the rotor;

a plurality of slots in the rotor disks aligned with the rotor slots and slidably receiving the sides of the vanes and corresponding ears;

the rotor disk, housing and vanes constructed so that, during operation of the device, fluid entering the housing through the inlet port is being carried by the rotor, in compartments formed between adjacent vanes, the rotor surface between those vanes, the rotor disk and corresponding portions of the end walls and sidewall of the housing, until the adjacent vanes encompass the outlet port whereby the fluid is allowed to leave the housing;

one or more apertures being provided in each vane, said apertures extending from the external edges to the internal edges of their corresponding vanes, the external edge of each vane being provided with a seal extending along that edge, from side to side of the vane, the seal constructed so as to permit fluid passage from

a chamber on one side of the vane to the bottom of the corresponding slot, below the vane, to assist in outward movement of the vane and holding the vane in extended position while restricting flow of the fluid from said compartment to the compartment on the other side of the vane;

each external edge vane seal being movable in a pocket extending along the external edge of the corresponding vane, between first and second positions on the end of the vane so as to provide passage of fluid through the corresponding vane aperture or apertures from one adjacent compartment when the seal is in said first position and from the other adjacent compartment when the seal is in the said second position; and an aperture through the rotor disk is provided [claim 7].